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Counting Cars: A Sustainable Development Experiential Learning Project

This manuscript outlines an experiential learning technique in which students integrate a beyond-the-classroom experience with the theories learned in the classroom in an Economics of Sustainable Development course. The project engages students in a hands-on economic research experience involving collecting, analyzing, and presenting data. Students get involved in an outside-the-classroom experience through counting cars. The project can also be conducted without the outside-the-classroom element. We provide suggestive evidence that supports the usage of structured experiential learning techniques in sustainability-based college-level courses by investigating student evaluations of teaching across two semesters. Findings show that the outside-the-classroom experience resulted in higher student evaluation of teaching, particularly in the *Instructor Performance* and *Learning and Skill Development* categories.

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1. Introduction

The majority of undergraduate economics courses continue to be taught in the traditional lecture format despite emerging literature that supports the effectiveness of active learning techniques in undergraduate economics courses (Allgood, Walstad, & Siegfried, 2015, Becker & Watts, 1996; Hansen, 1986, 2001). Structured active learning exercises increase student motivation, help students feel more engaged with the material, and foster higher-order thinking skills of students (Becker & Watts, 1995; Meyers & Jones, 1993; McGoldrick, Battle, & Gallagher, 2000; Salemi & Siegfried, 1999; Salemi et al., 2001; Sankaran, Mulroney Jr., & Corcoran, 2016). While education literature has emphasized experience as a source of learning and development (Kolb, 2015), the lack of readily implementable exercises coupled with the limited research on the usage of structured experiential learning techniques in economics has impeded faster adoption of these techniques in economic courses (Christoffersen, 2002).

Environmental educators have long understood that raising environmental consciousness involves connecting people to the environment and providing people with deeply engaging experiences (Nazir & Pedretti, 2014). For example, a recent study by Janakiraman, Watson, and Watson (2018) examines the literature in the use of games and concludes that games have the potential for producing attitudinal change on environmental sustainability. In this study, we outline an experiential learning technique in which students collect and analyze data to conduct an environmental and economic cost-benefit analysis in an Economics of Sustainable Development course. Experiential learning is learning through discovery and experience, in which concrete experiences form reflective observations that play a central role in the learning process (Kolb, 1984). In contrast to traditional classroom learning whereby the learner only reads, hears, talks, or writes about the topics being studied, experiential learning is learning in which the learner comes in direct contact with the realities being studied as part of the learning process (Keeton & Tate, 1978). Since learning is the process of taking in knowledge, learning can occur independently of teaching and does not necessarily have to involve instruction (Moon, 2004).

The project outlined in this manuscript provides students an opportunity to apply their economic ideas to answer questions and solve real-world problems. In the fall 2016 semester, students spent two days of class time outside the classroom counting the number of vehicles during peak traffic hours in the city of Columbia, South Carolina. Using the data collected, students outlined a procedure for the adoption of a more sustainable method of transportation after approximating the economic and environmental costs and benefits of associated lifestyle changes. This project is easy to implement and can be modified across various sustainability-based courses.

The paper proceeds as follows: Section 2 presents the steps of implementing an experiential learning strategy for instructors to effectively teach the topics of sustainability, externalities, transportation, and cost-benefit analysis. Section 3 investigates the student evaluations of teaching (SET) of the instructor across two semesters to examine the potential benefits of the structured outside-the-classroom element of the project. Section 4 concludes the paper.

2. The Project

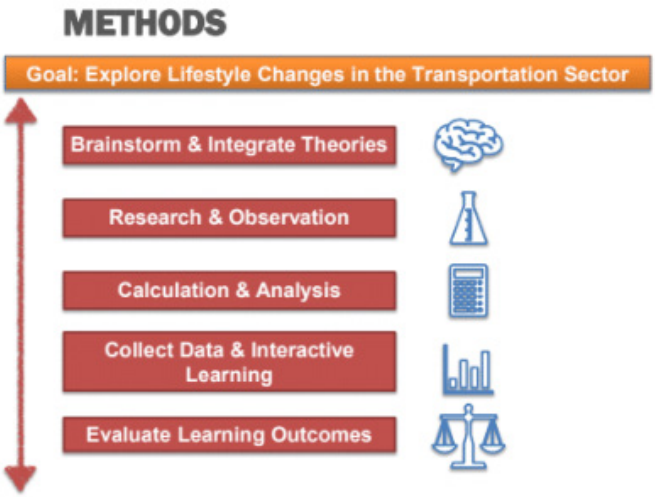
One of the themes of the Economics of Sustainable Development course is that achieving a sustainable future will require a change in lifestyle, particularly of people living in developed countries. These lifestyle changes will be needed to reduce the impact of both rapidly rising population and consumption per capita. Green lifestyles incorporate two key features: 1) they

have a lower environmental impact than existing lifestyles, and 2) they cost no more (or not much more) than existing lifestyles. The second feature is required to get people to adopt these lifestyles widely enough to have a significant positive impact on environmental quality.

Discussions of issues in the transportation sector are important in any sustainability course. According to the U.S. Energy Information Administration (EIA),[1] the transportation sector accounted for 28% of total primary energy consumption in the United States in 2015, second only to the electric power sector.[2] The transportation sector includes vehicles that transport people or goods, such as cars, trucks, buses, motorcycles, trains, aircraft, boats, barges, and ships. Petroleum provided 92% of all energy used in transportation. The EIA estimates that in 2015, U.S. motor gasoline and diesel fuel consumption for transportation resulted in emissions of 1,105 million and 440 million metric tons of carbon dioxide, respectively, for a total of 1,545 million metric tons of carbon dioxide, or 29% of total U.S. energy-related carbon dioxide emissions.

The project in the class requires students to explore the potential for lifestyle changes dealing with transportation. Figure 1 illustrates the process through which the project is implemented and outcomes evaluated. Students are first encouraged to brainstorm more efficient transportation methods with their group members. Some solutions provided by students include improvements in bus service leading to a reduction in car trips, high-occupancy vehicle (HOV) lanes, variable tolling, emission standards, fuel taxes, pedestrian-friendly sidewalks, bike/scooter rentals, ride sharing, expanding the use of the campus shuttle, bike lanes, or an app to match people interested in carpooling.

Figure 1: Research Method



After class discussions and readings on U.S. energy use, oil dependency, and the contribution of the transportation sector to greenhouse gas emissions, students embarked on the transportation project that made up 30% of their final grade in the class. To gather data for their project, students counted traffic twice during designated class times in the fall 2016 semester. To ensure that students were indeed at their designated intersections counting traffic, the students were instructed to post live videos on a Facebook group page every thirty minutes.

1 https://www.eia.gov/

[2]The five sectors in order of energy consumption are electric power, transportation, industrial, residential and commercial.

The instructor and a teaching assistant also drove around town and conducted random checks to ensure that the groups were at their posts. Appendix A details the mid-project evaluation that was distributed in class in-between the two days of traffic counting for reflection. The class meeting times for the semester were intentionally scheduled during peak traffic hours to ensure that students would be available to count traffic at this time. Since students counted traffic in Columbia, their projects were mostly limited to ways to reduce vehicular traffic within the city or the campus of the University of South Carolina (which is within the city). Appendix B contains an example of the traffic count sheet that students filled out and uploaded to Dropbox after both days of counting traffic.

Students then determine the environmental and economic benefits from their proposed change in technologies, integrating the theories that have been presented to them in class, and assigned readings with their real-life observations and research. Specifically, students calculate the environmental and economic costs and benefits of their proposed solution. This requires integrating estimates from the literature with the traffic data they collected and learning to make simplifying assumptions (e.g., the elasticity of vehicle miles traveled with respect to gasoline price). The environmental benefits of their proposed solution are quantified through reductions in external costs due to less driving. Estimates of these external costs include local pollution costs, oil dependency costs, greenhouse warming costs, congestion costs, and the costs of accidents calculated based on the estimates provided by Parry, Walls, and Harrington (2007) and Delucchi (1998). Students can also be prompted to include the concept of discounting in their projects, whereby students discount the environmental and economic benefits received in the future and compare them with the costs incurred today. For example, students might discount the toll revenue received in the future before comparing it with the infrastructure cost of constructing new tollbooths or increasing the number of highway lanes that would occur today.

Table 1 presents an example of a project submission in which the environmental and economic benefits of a proposed more sustainable transportation solution are calculated by the students based on different ranges of miles driven by passengers in the vehicles that enter the city during peak hours

Table 1: Example of the Cost-Benefit Analysis from a Student Project

number of miles driven	0-5 miles	5-10 miles	10-15 miles	15+
Estimated percentage of cars	10%	17%	70%	3%
Total number of cars	201	341	1406	60
midpoint number of miles driven	502.5 miles	2557.5 miles	17575 miles	900+ miles
Greenhouse warming externality	$ 1.51	$ 7.67	$ 52.73	$2.7+
Oil Dependency	$ 3.02	$ 15.35	$ 105.45	$5.4+
Local Pollution Externality	$ 10.05	$ 51.15	$ 351.50	$18+
Congestion Externality	$ 25.13	$ 127.88	$ 878.75	$45+
Accidents Reduction	$ 15.08	$ 76.73	$ 527.25	$27+
Totals	$ 54.79	$ 278.78	$ 1,915.68	$98.1+

The final step of the project involved assigning students the following four research articles regarding transportation: Covert, Greenstone, and Knittel (2016), Delucchi (1998), Parry, Walls, and Harrington (2007), and Ramey, and Vine (2011). After brief discussions in class about the aforementioned articles, each group summarized these articles, created video projects, and completed a peer review of the other groups' video projects . The final video projects were uploaded on Dropbox, with all students having access to this folder. This method, as opposed to traditional in-class presentations of completed projects, allows for the student peer reviews to be conducted outside of class time freeing up precious lecture time. Appendix C contains the peer review form that was completed by students and submitted to the instructor. The final video project was worth 20% of the student's grade in the course, and with an additional 10% from the other components described above.

3. Student Evaluations of Teaching

This section provides an investigation into the SET ratings for the course across two semesters, fall 2016 and spring 2017. To control for instructor characteristics[3] and course characteristics[4] that might influence the SET ratings, the same course was taught using the same syllabus and material by the same instructor in both semesters. The class enrollment in both semesters was 30 students and the classes were scheduled to meet on Tuesdays and Thursdays from 4:35-5:40 p.m.

The class taught in spring 2017 did not include the outside-the-classroom counting cars experiential learning element. Students were still required to complete a project on local energy use or the environmental impact of the transportation sector locally; however, students were not guided through the data collection methods. Rather, students were only provided with general guidelines to complete a traditional cost-benefit analysis on a topic of their choosing. as long as the project tackled a problem and provided an implementable solution related to local energy use or environmental issues. Students did not collect the data, but rather, used existing data to conduct their analysis. While students in both semesters were required to conduct an environmental and economic cost-benefit analysis as well as propose options for transitioning towards "greener" lifestyle choices, students in the latter semester were not exposed to outside-the-classroom experiential learning.

To keep the number of class meetings consistent across both semesters, a lecture was not held for two days during both semesters. In fall 2016, students counted cars on these two days. In the spring 2017 semester, the groups met with the instructor in her office to present their topics and ideas. In the spring 2017 semester, students provided project topics and outlines instead of the traffic count sheets. The other components of the project were identical across both semesters. A completed video project from a previous semester was played in class both semesters.

The SET results analyzed in this section represent the official online SET administered by the university using the same process that has been in place since fall 2010.[5] Appendix D shows the questions that appear on the survey. Table 2 presents the mean and standard deviations of the SET ratings on the summary indices for the fall 2016 semester (with the structured experiential learning experience) and the spring 2017 semester (without the structured

[3]See Finegan and Siegfried, 2000; Hamermesh and Parker, 2005; McPherson, Jewell, and Kim, 2009; Weinberg, Fleisher, and Hashimoto, 2009.

[4]See McPherson, 2006; McPherson, Jewell, and Kim, 2009; Ragan and Walia, 2010.

[5]See Breitbach, Sankaran, and Wagner, 2016 for more details on the online administration of the SET at the University of South Carolina.

experiential learning experience).[6] The mean ratings on the *Global Index* are 6 percent higher and the standard deviation is 31 percent lower during the fall 2016 semester; this translates to more students agreeing on the effectiveness of the instructor and the course when the course involved the counting cars element.

Table 2: Ratings from Student Evaluations of Teaching for Summary Indices

	Fall 2016 With Experiential Learning		Spring 2017 Without Experiential Learning		Percentage Change	
	Mean Ratings	Standard Deviation	Mean Ratings	Standard Deviation	Mean Ratings	Standard Deviation
Global Index	4.37	0.66	4.12	0.95	6.07	-30.53
Objectives of the Course	4.22	0.65	4.32	0.91	-2.32	-28.57
Instructor Performance	4.64	0.53	4.27	0.94	8.67	-43.62
Learning and Skill Development	4.42	0.61	4.05	0.96	9.14	-36.46
Course Materials	4.31	0.77	4.01	0.98	7.48	-21.43
Other Questions	4.27	0.72	3.92	0.96	8.93	-25.00

This table provides the average ratings on a set of summary statistics, or summary indices that give quick feedback on each of the five categories and the evaluation as a whole. The summary indices are calculated by averaging across questions in a given category. The global index is the average rating of all questions on the SET.
The questions on the SET are rated on a scale from one to five with a one denoting the student strongly disagrees (very dissatisfied) and a five representing the student strongly agrees (very satisfied).
Percentage change is calculated by subtracting the spring 2017 ratings from the fall 2016 ratings.
Two-tailed t-tests show that the differences in scores were significant at the 10% level for the *Instructor Performance* and *Learning and Skill Development* categories, with p-values of 0.0654 and 0.0800, respectively.

In addition to the *Global Index* that represents the overall SET results, administrators weigh the *Instructor Performance* and *Learning and Skills Development* categories heavily as indicators of effective teaching. As can be seen from Table 2, the average ratings of the *Instructor Performance* category is approximately 9 percent higher with a 44 percent lower standard deviation, and the average ratings of the *Learning and Skills Development* category is also 9 percent higher with a 37 percent lower standard deviation in the fall 2016 semester. The mean ratings were higher in the fall 2016 semester for all categories except for the *Objectives of the Course* category; this category received a 2 percent lower mean rating and a 29 percent lower standard deviation in the fall 2016 semester. Given the small sample size, most of

[6]We present both the mean and standard deviations on the SET ratings since the findings of Sankaran, Breitbach, and Wagner, 2018 show that these two statistics reveal different information.

the differences in Table 2 are only suggestive and not statistically significant. Nevertheless, differences in *Instructor Performance* and *Learning and Skill Development* scores are statistically significant at the 10% level. Furthermore, while all else was held equal across the semesters, given the additional instructor experience in spring 2017 relative to fall 2016, if anything we would expect evaluations to improve in the latter semester. This would bias our results *downwards*, making the somewhat significant *increase* in scores striking.

Table 3 presents the mean and standard deviation of ratings on the subcategory questions that appear in the SET. The mean ratings were higher in 19 out of the 22 questions investigated. Driving the lower ratings on the *Objective of the Course* category during the fall 2016 semester was the *Learning Outcomes* subcategory that received 5 percent lower mean ratings in fall 2016. While the majority of questions saw higher mean ratings in the fall 2016 semester, the top three biggest percentage changes were seen in the questions about *Recommend the Instructor*, *Learned a Great Deal*, and *Effective Teaching Style* that were higher by 19 percent, 16 percent, and 16 percent, respectively. The question on whether the student would *Recommend the Instructor* not only saw the biggest positive change in mean rankings, it also showed the largest change in standard deviations across the two semesters at 68 percent. This shows that the students were more likely to recommend the instructor to other students, and much more likely to agree on this recommendation during the semester that involved the structured outside-the-classroom element. The question on *Effective Teaching Style* showed the second highest change in the standard deviations with students more likely to agree on the effectiveness of the teaching style of the instructor in the fall 2016 semester.

Table 3: Ratings from Student Evaluations of Teaching on Specific Questions

	Fall 2016		Spring 2017		% Change	% Change
	With Experiential Learning		Without Experiential Learning			
	Mean Ratings	Standard Deviation	Mean Ratings	Standard Deviation	Mean Ratings	Standard Deviation
Objectives of the Course						
Learning Outcomes	4.11	0.60	4.36	0.85	-5.73	-29.41
Course Content	4.33	0.71	4.29	0.96	0.93	-26.04
Instructor Performance						
Clarity on grade determination	4.67	0.50	4.35	0.94	7.36	-46.81
Attendance policy	4.56	0.53	4.33	0.9	5.31	-41.11
Timeliness of feedback	4.44	0.73	4.42	0.87	0.45	-16.09
Regular class meetings	4.78	0.44	4.5	0.83	6.22	-46.99

Reasonable office hours	4.56	0.53	4.27	0.95	6.79	-44.21
Instructor availability	3.78	0.44	3.32	0.78	13.86	-43.59
Usefulness of additional resources	4.33	0.7	4.2	0.92	3.10	-23.91
Instructor was well-prepared	4.67	0.5	4.22	0.95	10.66	-47.37
Instructor was knowledgeable	4.78	0.44	4.41	0.88	8.39	-50.00
Effective teaching style	4.78	0.44	4.12	1.06	16.02	-58.49
Recommend this instructor	4.89	0.33	4.1	1.03	19.27	-67.96
Willingness to help	4.78	0.44	4.28	0.9	11.68	-51.11
Helpful feedback from instructor	4.44	0.73	4.01	1.11	10.72	-34.23
Learning & Skill Development						
Learned a great deal	4.67	0.50	4.02	0.97	16.17	-48.45
Analytical thinking	4.67	0.50	4.19	0.87	11.46	-42.53
Useful later in career	4.11	0.78	4.21	0.9	-2.38	-13.33
Development of written and oral communication	4.22	0.67	3.77	1.1	11.94	-39.09
Course Material, Examinations, and Assignments						
Usefulness of textbook	3.5	1.31	3.8	1.14	-7.90	14.91
Consistent exams and assignments	4.67	0.50	4.04	1	15.59	-50.00
Challenging exams and assignments	4.67	0.50	4.2	0.8	11.19	-37.50

The questions on the SET are rated on a scale from one to five with a one denoting the student strongly disagrees (very dissatisfied) and a five representing the student strongly agrees (very satisfied).
Percentage change is calculated by subtracting the spring 2017 ratings from the fall 2016 ratings.

4. Conclusion

Instructors normally hesitate to adopt non-traditional teaching methods in economics due to the additional commitments and risks that are involved. Engaging in such techniques requires a larger initial time commitment for the instructor in terms of designing and structuring

the experiential technique. Furthermore, the instructor might be hesitant to take the risk of engaging in non-traditional teaching methods. In this manuscript, we provide a simple cost-benefit exercise that can be utilized in various courses including Energy Economics, Environmental Economics/Analysis, Public Sector Analysis, Urban Planning and Transportation, or Sustainable Development. The project can also be modified for a cost-benefit analysis in lower-level courses that have environmental or transportation components.

We outline a strategy that instructors could use to teach economic and environmental cost-benefit analysis--a structured project involving experiential learning. The experiential learning technique involves outside-the-classroom data collection whereby students count vehicle traffic during peak travel times. We then compare instructor evaluations for a course taught using this experiential learning project to an otherwise identical course taught with a more conventional cost-benefit project.

An investigation of the mean and variances on SET ratings of the course taught by the same instructor across two semesters, one in which the class was taught with the structured outside-the-classroom experiential learning element and one without, reveals higher ratings on almost all of the SET questions when the structured outside-the-classroom experiential learning method is used. While the instructor received high mean teaching evaluations both semesters, with the mean rankings consistently above a 4 on a 1-5 scale, we show that the payoff to the instructor of using the structured outside-the-classroom experiential learning technique could be in the form of even higher teaching evaluations, particularly on the *Instructor Performance* and the *Learning and Skill Development* categories. Students are more likely to recommend the instructor to other students and more likely to agree on their recommendations. They also report that they learned more and that the instructor has a more effective teaching style when the class includes the outside-the-classroom experiential learning element.

Given the small sample size of this study, our examination of teaching evaluations mostly serves as suggestive evidence of the effectiveness of experiential learning (though we do find some evidence of statistically significant increases in instructor evaluation scores). While randomization was not possible, everything else was kept the same across the two semesters--instructor, curriculum, class time, etc., except for the experiential learning component. We hope our study will serve as an example on which instructors and future researchers can build on. Future researchers might also want to investigate the downstream effects of experiential learning projects in the form of enrollment and performance in future economics courses or completion of the economics major.

Working in pairs outside of the classroom can also help students form a deeper connection with each other and foster active learning.[7] Table 4 below synthesizes the benefits to the instructor and students, as well as possible societal benefits of engaging in the non-traditional experiential learning project outlined in this manuscript. Despite a greater upfront time commitment to structure the assignment, there are payoffs in terms of self-reported student learning and instructor performance measures from instructor evaluations. We hope that the information presented in this article regarding the cost-benefit sustainable development project will motivate more educators at the collegiate level to attempt similar non-traditional teaching methods in their classes and pursue further research on examining the effectiveness of active learning techniques.

[7]Coincidentally, two of the students who were paired up to count cars for the project are now engaged to be married. They approached the instructor a few months after the course had been completed informing the instructor that after meeting for the first time when paired up for the project and getting to know each other well while outdoors counting cars together, they started dating.

Table 4: Possible Benefits of the Proposed Experiential Learning Project

BENEFITS

Instructor Benefits:

- Engage in Applied Instructional Techniques
- Evolve with New Teaching Methods
- Flexible Applications in all Levels of Economics Courses
- Cost-Benefit Analysis
- Interdisciplinary Teaching Methods
- Connect Students with Real-life Experiences
- Better Student Evaluation Results & Learning Outcomes
- Outside-the-Classroom Engagement with Students
- Perceived as an Approachable Instructor
- A Fulfilling Teaching Experience

Student Benefits:

- Research Experience and Data Collection Exposure
- Flexibility with Research Techniques
- Engagement with Real-Life Situations
- Builds Commitment, Responsibility and Creativity
- Fosters Cooperation and Leadership
- Application of Social Problems & Environmental Challenges
- Exposure to the Transportation Sector & Externalities
- Fosters Critical Thinking Skills
- Builds Fundamental Skills for Future Career
- Problem Solving Ability while Tackling Complex Issues
- Increases exposure to Interdisciplinary Studies
- Making a Connection between Personal Choices & Environmental Issues
- Rethinking Lifestyle Choices for the Greater Good
- Increases Student Motivation, Retention, and Depth of Understanding

Societal Benefits:

- Increases Awareness of Societal Issues
- Teaching Innovation Method
- Better Learning Outcomes
- Builds a Stronger Student-Instructor and Student-to-Student Bond
- Promotes Better Understanding of the Public Sector
- Creates New Knowledge & Ideas
- Stimulates Innovation & Critical Thinking Skills
- Encourages *Greener* Lifestyles
- Inspires Careers & Future Research in Related Fields
- Applied Research Skills Create more Capable Employees for the Labor Force

References

Allgood, S., Walstad, W. B., & Siegfried, J. J. 2015. Research on teaching economics to undergraduates. *Journal of Economic Literature, 53*(2), 285-325.

Becker, W. E., & Watts, M. 1995. Teaching tools: Teaching methods in undergraduate economics. *Economic Inquiry,* 33, 692-700.

Becker, W. E., & Watts, M. 1996. Chalk and talk: A national survey on teaching undergraduate economics. *The American Economic Review*, *86*(2), 448-453.

Breitbach, E., Sankaran, C., & Wagner, J. 2016. The movement to online course evaluations: Do we hear from more complainers? *Perspectives on Economic Education Research (PEER)*, *10*(1), 41-56.

Christoffersen, S., 2002. An active learning tool for the principles of economics: The allocation exercise. *The American Economist*, *46*(2), 65-68.

Covert, T., Greenstone, M., & Knittel, C. R. 2016. Will we ever stop using fossil fuels?" *The Journal of Economic Perspectives*, *30*(1), 117-137.

Delucchi, M.A. 1998. The annualized social cost of motor-vehicle use in the U.S., 1990-1991: summary of theory, data, methods and results. Institute of Transportation Studies, University of California Davis, California, Report #1.

Finegan, A. T., & Siegfried, J. J. 2000. Are student ratings of teaching effectiveness influenced by instructors' English language proficiency? *The American Economist*, *44*(2), 17-29.

Hamermesh, D. S., & Parker, A. M. 2005. Beauty in the classroom: Instructors' pulchritude and putative pedagogical productivity. *Economics of Education Review, 24*, 369–376.

Hansen, L. W. 1986. What knowledge is most worth knowing for economics majors?" *American Economic Review*, 76 (2): 149-152.

_____, 2001. "Expected proficiencies for undergraduate economics majors. *The Journal of Economic Education*, *32*(3), 231-242.

Janakiraman, S., Watson, S. L., & Watson, W. R. 2018. Using game-based learning to facilitate attitude change for environmental sustainability. *Journal of Education for Sustainable Development, 12*(2), 176-185.

Keeton, M., & Tate, P. 1978. *New directions for experiential learning.* San Francisco: Jossey Bass.

Kolb, D. A. 1984. *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.

Kolb, D. A. 2015. *Experiential learning: Experience as the source of learning and development*. New Jersey: Pearson Education Inc.

McGoldrick, K., Battle, A., & Gallagher, S. 2000. Service-learning and the economics course: Theory and practice. *The American Economist*, *44*(1), 43-52.

McPherson, M.A. 2006. Determinants of how students evaluate teachers. *The Journal of Economic Education*, *37*(1), 3-20.

McPherson, M. A., Jewell, R. T., & Kim, M. 2009. What determines student evaluation scores? A random effects analysis of undergraduate economics classes. *Eastern Economic Journal*, *35*, 37-51.

Meyers, C., & Jones, T. B. 1993. *Promoting active learning: Strategies for the college classroom.* San Francisco: Jossey-Bass.

Moon, J. A. 2004. *A handbook of reflective and experiential learning: Theory and practice.* New York: Routledge Farmer.

Nazir, J., & Pedretti, E. 2014. Educators' perceptions of bringing students to environmental consciousness through engaging outdoor experiences. *Environmental Education Research*, *22*(2), 288-304.

Parry, I. Walls, W. H., M., &. Harrington, W. 2007. Automobile externalities and policies. *Journal of Economic Literature*, *XLV*, 373-399.

Ragan, J. F., & Walia, B. 2010. Differences in student evaluations of principles and other economics courses and the allocation of faculty across courses. *The Journal of Economic Education*, *41*(4), 335-352.

Ramey, V. A., & Vine, D. J. 2011. Oil, automobiles, and the U.S. economy: How much have things really changed? *NBER Macroeconomics Annual*, *25*(1), 333-368.

Salemi, M. K., & Siegfried, J. J. 1999. The state of economic education. *American Economic Review*, *89*(2), 355-361.

Salemi, M. K., Siegfried, J. J., Sosin, K., Walstad, W., & Watts, M. 2001. Research in economic education: Five new initiatives. *American Economic Review*, *91*(2), 440-445.

Sankaran, C., Breitbach, E., & Wagner, J. 2018. Rethinking how we evaluate teaching effectiveness: Does only the mean matter. *Perspectives on Economic Education Research (PEER)*, *11*(1), 73-87.

Sankaran, C., Mulroney Jr., T., & Corcoran, D. 2016. An exercise on creating a student expenditure basket. *Journal of Economics Teaching (JET)*, *1b*(2), 90-110.

Weinberg, B., Fleisher, B., & Hashimoto, M. 2009. Evaluating teaching in higher education. *Journal of Economic Education*, *40*, 227-261.

Appendix A

Mid-Project Reflection

Name: _____

What was one thing that you enjoyed about the assignment on Thursday? One thing you disliked?

What did you learn by counting traffic on Thursday (other than the heat)?

What went according to plan and what surprises did you encounter? How did you address/ troubleshoot them?

If you were to have done one thing differently, what would it be and why?

What do you think is the aim of this project? What is it important?

Rate how relevant this project is to the material on a scale of 1-5 with 1 representing not connected at all and 5 reflecting extremely connected. 1 2 3 4 5

Explain how you think this project connects to the class? Try to use specific examples.

Appendix B

Traffic Count Sheet Template

Name of Group Members:

Were there any accidents or events in your area?

If yes, please list the events and/or the number of accidents.

Date: 9/29/2016

also record, if possible, the different types of vehicles and any other observations

TIME	TRAFFIC COUNT (number of cars going through the intersection at this time)
4:00-4:10	Car/Truck/Van: 126; Motorcycle/Moped: 1; Bus: 0; Semi/Truck: 4
4:10-4:20	Car/Truck/Van: 142; Motorcycle/Moped: 0; Bus: 0; Semi/Truck: 2
4:20-4:30	Car/Truck/Van: 151; Motorcycle/Moped: 1; Bus: 0; Semi/Truck: 2
4:30-4:40	Car/Truck/Van: 165; Motorcycle/Moped: 1; Bus: 0; Semi/Truck: 3
4:40-4:50	Car/Truck/Van: 191; Motorcycle/Moped: 1; Bus: 0; Semi/Truck: 0
4:50-5:00	Car/Truck/Van: 156; Motorcycle/Moped: 1; Bus: 0; Semi/Truck: 2
5:00-5:10	Car/Truck/Van: 188; Motorcycle/Moped: 2; Bus: 0; Semi/Truck: 2
5:10-5:20	Car/Truck/Van: 211; Motorcycle/Moped: 0; Bus: 0; Semi/Truck: 1
5:20-5:30	Car/Truck/Van: 146; Motorcycle/Moped: 0; Bus: 0; Semi/Truck: 0
5:30-5:40	Car/Truck/Van: 192; Motorcycle/Moped: 0; Bus: 0; Semi/Truck: 0

Don’t forget to upload your one-minute videos to Facebook at 4:20, 4:50, 5:20 and 5:40.

Appendix C

Video Project Peer Review Form

ECON 509

Fill out one for each video

Name:

PRESENTERS' NAMES:

RESEARCH PROJECT TITLE:

Question 1: If you were able to grade this presentation on a scale of 1 to 3 (where 1 represents poor, 2 adequate, 3 good) what grade would you assign to it and why?

Question 2: What are the strengths of this presentation?

Question 3: What are some of the weaknesses of this presentation? Suggest improvements?

Question 4: If you were able to ask a question to this presenter about the project, what question would you ask?

Question 5: What was one thing you learned from watching the video that you didn't know or didn't think of before?

Appendix D

Student Evaluation of Teaching Form

Class Climate	School of Business Course Evaluation [Copy]	SCANTRON
University of South Carolina	John Doe	
Moore School of Business	ECON Course	

Mark as shown: ☐ ☒ ☐ ☐ ☐ Please use a ball-point pen or a thin felt tip. This form will be processed automatically.

Correction: ☐ ■ ☐ ☒ ☐ Please follow the examples shown on the left hand side to help optimize the reading results.

OBJECTIVES OF THE COURSE

	Strongly Disagree	Disagree	Neither Agree/Disagree	Agree	Strongly Agree	Not Applicable
1. The instructor clearly stated the learning outcomes of the course.	☐	☐	☐	☐	☐	☐
2.The content of the course was consistent with the course learning outcomes.	☐	☐	☐	☐	☐	☐

INSTRUCTOR PERFORMANCE

3. The instructor clearly stated the methodology by which your final grade would be determined.	☐	☐	☐	☐	☐	☐
4. Instructor clearly explained any special requirement of the attendance which differ from the attendance policy of the University.	☐	☐	☐	☐	☐	☐
5. The instructor graded and returned the student's written work (e.g.,examinations and papers) in a timely manner.	☐	☐	☐	☐	☐	☐
6. The instructor met the class regularly and at the scheduled times.	☐	☐	☐	☐	☐	☐
7. The instructor scheduled a reasonable number of office hours per week.	☐	☐	☐	☐	☐	☐

8. Please indicate your satisfaction with the availability of the instructor outside the classroom by choosing from the scale below (In selecting your rating, consider the instructor's availability via established office hours, appointments, and other opportunities for face-to-face interaction as well as via telephone, e-mail, fax and other means.	Very Dissatisfied	☐	☐	☐	☐	☐	Very Satisfied
9. If Web sites, Blackboard or other Internet resources were a part of this course, to what extent did they enhance or detract from your learning experience in this course.	Greatly Detracted	☐	☐	☐	☐	☐	Greatly Enhanced

Class Climate	School of Business Course Evaluation [Copy]	SCANTRON

INSTRUCTOR PERFORMANCE [Continue]

	Strongly Disagree	Disagree	Neither Agree/Disagree	Agree	Strongly Agree	Not Applicable
10. The instructor was consistently well prepared for class.	☐	☐	☐	☐	☐	☐
11. The instructor was very knowledgeable about the material covered in the course.	☐	☐	☐	☐	☐	☐
12. The instructor's teaching style was effective in stimulating learning.	☐	☐	☐	☐	☐	☐
13. I would recommend this instructor to other students.	☐	☐	☐	☐	☐	☐
14. The instructor displayed willingness to provide me with help and guidance.	☐	☐	☐	☐	☐	☐
15. The instructor provided helpful feedback to me on my work.	☐	☐	☐	☐	☐	☐

LEARNING AND SKILL DEVELOPMENT

16. Overall, I learned a great deal from this course.	☐	☐	☐	☐	☐	☐
17. The course challenged me to think analytically.	☐	☐	☐	☐	☐	☐
18. This course provided knowledge that will be useful to me later in my career.	☐	☐	☐	☐	☐	☐
19. The course required me to utilize and develop written and/or oral communication skills.	☐	☐	☐	☐	☐	☐

COURSE MATERIAL, EXAMINATIONS, AND ASSIGNMENTS

20. The textbook and other course material contributed to my learning.	☐	☐	☐	☐	☐	☐
21. Examinations and assignments were consistent with the course material and class sessions.	☐	☐	☐	☐	☐	☐
22. Examinations and assignments were challenging and intellectually stimulating.	☐	☐	☐	☐	☐	☐